Lesson concept: “Forest detectives – What happened to the forest?”

Primary school, grade 4, approx. 45 minutes | General studies

Acknowledgements

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1. Quick-reference sheet with the key facts

Lesson topic	“Forest detectives – What happened to the forest?”
Subject	General studies (Sachunterricht)
Grade / school type	Grade 4, primary school
Time frame	approx. 45 minutes (core lesson); optional extensions +5–10 min. each
Curriculum reference DE	Learning area 3 “Encounters with plants and animals” and learning area 4 “Encounters with phenomena of inanimate nature” (Saxony primary school curriculum for general studies, 2004/2009/2019)
Curriculum reference CZ	Education are: People and Their Worlds (Člověk a jeho svět), thematic unit Diversity of Nature (Rozmanitost přírody) Cross-curricular theme: Sustainable Environment (Udržitelné prostředí) RVP 2025 (Czech Framework Curriculum for Elementary Education)
Lesson objective (short form)	The children recognise that forests can change due to events such as fire, and that they recover again over time.
Social forms	Whole class, group work (ability-based, differentiated), individual/pair work in the creative phase
Central method	Personified narrative (tree stump as narrator) with picture/text card puzzle; discovery learning through the “forest detectives” role play
Core materials	Picture pair (healthy / damaged forest), picture and text cards A–D, differentiated vocabulary cards, reflection cards (14x14 cm), A1 poster
Differentiation	Two material variants (linguistically simplified / extended), distinguished by the colour of the card labelling

2. Curriculum reference

DE

This lesson belongs to learning area 3, "Encounters with plants and animals", of the Saxon primary school curriculum for general studies, grade 4. It pursues the goal of getting to know the forest as a living community.

In addition, the lesson can be assigned to learning area 4, "Encounters with phenomena of inanimate nature" (also grade 4). Here, the focus is on learning about the influence of fire on human life.

CZ

The lesson aligns with the revised Czech National Curriculum for Primary Education (RVP ZV), particularly within the educational area People and Their World (Člověk a jeho svět). It supports the thematic area Diversity of Nature (Rozmanitost přírody) by encouraging pupils to observe natural processes, recognise changes in the environment, and understand relationships between living organisms and their surroundings.

The activities promote inquiry-based learning through observation, comparison, asking questions, and drawing conclusions from real-world evidence, including satellite images. They also contribute to the development of digital competence, as pupils work with visual data to investigate environmental change.

In addition, the lesson supports the cross-curricular theme Sustainable Environment (Udržitelné prostředí) by fostering environmental awareness, understanding of ecosystem dynamics, and responsible attitudes towards nature.

3. Subject-matter analysis

3.1 Forest in transition: forest fire and regeneration

Forests are dynamic ecosystems that are continually changed by natural disturbances such as periods of drought and fires. Prolonged dryness reduces the moisture in the soil and vegetation, thereby increasing the flammability of organic material. Under these conditions, a single spark – whether caused by lightning or human activity – can trigger a forest fire that spreads quickly through dry undergrowth and into the tree canopy.

After a fire, the ecosystem changes fundamentally: trees die or burn, the soil loses nutrients and its capacity to absorb water, and the protective canopy cover disappears. However, this is not final destruction but a disturbance followed by a process of regeneration: resilient pioneer plants settle first, seeds are carried in by wind and animals, and the soil slowly stabilises again. In a more advanced phase, young trees grow up, water can seep in more easily again, and the ecosystem gradually approaches a new equilibrium. This cycle of disturbance and regeneration is a central principle of forest ecology and forms the subject-matter basis of the lesson.

3.2 Remote sensing as a research method (subject-matter background for the teacher)

Remote sensing methods allow landscapes and forests to be examined from a distance, for example using satellites, aircraft or drones. Aerial and satellite images make it possible to identify whether trees are healthy or damaged, which areas have been affected by fire, drought or pests such as the bark beetle, and how a forest recovers after a disturbance.

To do this, images from different points in time are compared. Changes in the colour, density or extent of the wooded areas provide clues to the condition of the forest. Tools used include satellites, drones, aircraft with special cameras, GPS devices and computer programs for image analysis. In some cases, laser scanners (LiDAR technology) are also used to record the height and structure of a forest.

The research process can be described, in simplified terms, in four steps: (1) capturing images or measurement data, (2) comparison with older images, (3) computer-assisted analysis of the changes, (4) interpretation of the results by researchers. The digital data is often supplemented by on-site field observations. The time required varies greatly: individual images can be captured within a few hours, but the full analysis can take days, weeks or months; long-term forest monitoring sometimes extends over several years.

A child-friendly version of this explanation, used as part of optional extension 2, can be found in the appendix (see 8.7).

4. Learning objectives

Acquiring knowledge: The students know about the damage and changes forests undergo as a result of fires.

Developing competence (methodological competence): The students compare visual material and arrange picture and text cards into a meaningful sequence according to given criteria.

Values orientation: The students appreciate the value of the forest for nature.

5. Brief didactic-methodological analysis

5.1 Framing as "forest detectives"

Framing the lesson as a role play in which the children act as detectives increases motivation and creates a consistent thread running through the lesson: the children actively investigate clues (pictures, text cards) instead of simply receiving content passively.

5.2 Narrative perspective

The story is told throughout from the perspective of the tree stump, which appears as a personified, consistent narrator from the beginning (story prompt in phase 2) to the end (section D of the "real" forest story). This continuous narrative voice, together with the consistently past-tense telling of the flashbacks, creates narrative coherence and makes it easier for the children to follow the story's timeline. The short introductory story in phase 2 is continued in phase 3 (part 2) rather than repeated; the teacher makes this connection explicit (e.g. "As you remember, the tree stump already told us that it was once a big, strong tree – now it tells the whole story."), to avoid redundancy and pick up on the suspense from the introduction.

5.3 Differentiation

Since differentiated materials can be used in the lesson, an ability-based grouping is recommended, without visibly "grading" the children in the process. The teacher receives the picture and text cards in two variants, which differ by the colour of the lettering (e.g. "A 2021"):

- Green lettering → simplified material: linguistically reduced texts (4–5 short sentences), suitable for children with additional support needs (e.g. dyslexia, German as a second language).
- Brown lettering → extended material: more detailed factual information (6–7 sentences), suitable for higher-achieving students.

The children are assigned to the material variants beforehand together with the class teacher, so that ability-homogeneous groups can be formed and the materials used in a precisely targeted way.

In addition, subject-specific vocabulary is used in a differentiated way: higher-achieving students receive vocabulary cards with technical terms (ecosystem, regeneration, lush, intense, unstable), which they paraphrase or, alternatively, explain themselves as part of a research task on a child-friendly website. For lower-achieving students, the same terms are replaced with simpler, everyday words to ensure they can fully take part in the task.

5.4 Optional idea: working with real objects

Since General Studies lessons benefit particularly from direct encounters with real objects rather than pictures alone, it would enrich the lesson – where possible – to additionally bring in a healthy branch/twig and a burnt branch or small twig. The children could compare and examine both directly alongside the pictures and the story, using subject-specific methods of General Studies such as observing, examining and comparing, to work out which changes were caused by the fire.
This idea is not a required part of the lesson but an optional enrichment, depending on the availability of suitable material.

6. Lesson sequence

Phase	Time	Procedure / content	Material
1. Introduction	10 min.	Prompt using two pictures (healthy vs. damaged forest): "This is the same forest – but something has happened." Activating questions: Is this really the same place? What is different? What might have happened? In which forest would you rather spend time? Which forest is better for people, animals and plants? If desired, the entire lesson can be supported by a PowerPoint presentation. Aim: to spark curiosity and gather initial ideas. The photos can be displayed in printed form, on a screen or using a projector.	Picture pair (A3, board/visualiser, see 8.1) Optional: PowerPoint presentation for the whole lesson (see Appendix 8.11)
2. Story prompt	5 min.	The teacher shows a picture of a tree stump and, using a disguised voice, tells the beginning of the story of the tree stump, which was once a big, strong tree and toppled over due to drought and heat. Guiding question: What do you think happened in this forest? How might the story continue? This short narrative is continued in phase 3 (part 2), not repeated.	Picture of text cards A EVOCATION
3. Development – part 1: picture and story puzzle	15–20 min.	Group work: arranging four A5 pictures (before, forest fire, after, first recovery) and four jumbled A5 text cards into a meaningful sequence. Guiding questions: What came first? What has changed? How can you tell? Differentiation: higher-achieving groups additionally receive vocabulary cards with technical terms (ecosystem, regeneration, lush) or, alternatively, a research task on a child-friendly website (e.g. https://klexikon.zum.de/wiki/Klexikon:Willkommen_im_Klexikon, https://www.helles-koepfchen.de/, https://www.fragfinn.de/ or https://kiwithek.wien/index.php?title=Hauptseite); for lower-achieving groups, the same terms are replaced with simpler words. Aim: independently working out a story of change.	Picture/text cards A–D (two differentiation levels: green/brown lettering, see 8.4) Vocabulary cards (see 8.5) Optional: real healthy and burnt branch/twig for direct comparison UNDERSTANDING OF MEANING

3. Development – part 2: the "real" forest story	10 min.	The teacher continues the tree-stump narrative begun at the start and tells the scientific explanation in a child-friendly way in four sections (A–D), optionally supported by a PowerPoint presentation with images for each stage (A–D). Central message: "Forests are alive. They change, and they can recover."	Narrative text A–D (see 8.2) Optional: PowerPoint presentation of forest story (see Appendix 8.3)
Extension 1 (optional)	5–10 min.	The children develop their own headings for the four phases of the story and assign them to the enlarged pictures on display (giving reasons for their choices). The Pictures A–D can be displayed in printed form, on a screen or using a projector.	Pictures A–D in A3, board (see 8.4 and 8.6)
Extension 2 (optional)	10–15 min.	Working out why it makes sense to observe changes in the forest, even without constantly being there in person. First, the class collects ways of observing the forest on site. The teacher adds that you do not always have to be there in person. That is why there is another way of examining the forest – namely from a distance. This method is called remote sensing. The term "remote sensing" is then introduced using the child-friendly explanation. Illustration through examples (aeroplanes, drones, satellites) and aerial photographs. These can be displayed in printed form, on a screen or using a projector.	Child-friendly explanation of "remote sensing" (see 8.7) Example images/aerial photographs (see 8.8)
4. Reflection and creative phase	10 min.	The children creatively express their idea of the forest's future (drawing a picture, writing 2–3 sentences, or both) in response to the guiding questions: Why was the tree stump sad? What will the forest look like in the future? Can we contribute to that? All contributions are glued onto a shared class poster. The class poster makes the results of all the students visible and provides an appreciative conclusion to the lesson. Aim: reflecting on what has been learnt, fostering imagination, an appreciative conclusion. The poster does not need to be printed if an existing poster is being used.	Cards 14x14 cm (see 8.9) and A1 poster (see 8.10) REFLECTION

7. Bibliography

Saxon State Ministry for Education (Sächsisches Staatsministerium für Kultus): Primary school curriculum, general studies (2004/2009/2019 editions). https://www.schulportal.sachsen.de/lplandb/lehrplan/80.

8. Appendix

8.1 Picture pair for the introduction





8.2 Narrative text of the tree stump story (A–D)

Story prompt:

“I was once a big, strong tree,” the tree stump began to tell. “For many years I stood in the middle of the forest. But one day the forest changed. It became dry and hot. I wasn't spared either. Over time my wood became soft and mushy. One day I couldn't stand any more and toppled over. Today I'm just a tree stump.”

A – 2021: The healthy forest

“As you remember, I was once a big, strong tree,” the brown tree stump said, picking up the story from the beginning of the lesson again. “Back then, the forest around me was full of life.”

Everything was calm and in balance. Tall trees stood close together, forming a big, green canopy of leaves. Sunlight fell onto the forest floor only in small, golden patches. Beneath it grew a carpet of grasses, ferns and small shrubs. The soil was soft, moist and full of nutrients.

“I remember well,” said the tree stump quietly, as its brown wood glowed in the light, “how many animals lived here: insects, birds, deer. Everything belonged together. Everyone had their place. The forest was alive and strong.”

B – 2022: The great change

But then something changed.

“It began during a hot, dry summer,” the tree stump said, more seriously now. “It hadn't rained for a long time. The soil became dry, the leaves as light as paper.”

A single spark – perhaps caused by lightning, perhaps by people – was enough. A fire broke out.

“The forest couldn't protect itself quickly enough.”

The flames spread. They ate their way through dry grass, climbed up the trees, and crackled through the canopy. The forest, which had been stable for so long, fell out of balance.

Many trees burned or died. The big tree that this stump had once been also fell victim to the flames.

When the fire was over, a silent, unfamiliar landscape remained. No green leaves. No shade-giving canopy.

“Only tree stumps like me were left standing,” said the stump. “The soil had turned dark, hard and tired. Rain could hardly soak in any more. Many nutrients had disappeared.”

The forest was no longer the same. But it hadn't disappeared.

C – 2023: First signs of hope

Time passed.

“At first it was quiet,” the tree stump said. “Almost everything seemed lost. But the forest didn't give up so easily.”

Slowly, small changes began.

A few especially hardy plants grew back first. Small flowers pushed their way through the dark soil. Grasses ventured cautiously into the light.

Seeds came back – carried by the wind, by birds, by animals visiting the place again.

“I saw how life slowly returned,” said the stump. “Not all at once. But step by step.”

The soil, however, was still weak. Rain drained away poorly, and many patches stayed barren. The forest was in a recovery phase – like someone who had been sick for a long time and was slowly regaining their strength.

“You couldn't yet say that everything was fine,” the tree stump said honestly. “But there was hope again.”

D – 2024: The forest heals itself

And then came the time when something really changed.

“Now I was here again,” the tree stump said calmly. “And I saw how the forest was healing.” His wood was still black and charred from the fire. Yet all around him, new growth was beginning to appear.

Young trees grew out of the ground. Delicate, green shoots stretched upward. They were still small, but full of energy.

The wind carried in new seeds. Animals helped bring the forest back to life. Through plant remains and new roots, the soil slowly became more fertile and loose again. Water could soak in more easily once more.

Everywhere it grew greener. Only the tree stump itself remained black, like a silent reminder of the fire, surrounded by new vegetation.

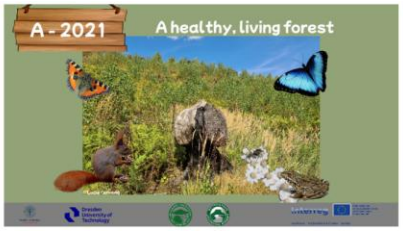
“I was only a stump now,” said the tree stump, “but I wasn't useless. I held the soil in place, gave insects shelter, and slowly became part of the cycle of life myself again.”

The forest was no longer the same as before – but it was alive again.

And it showed something important: “The forest was capable of change. It could suffer damage. But it had an astonishing power: it could recover.”

8.3 PowerPoint presentation of forest story







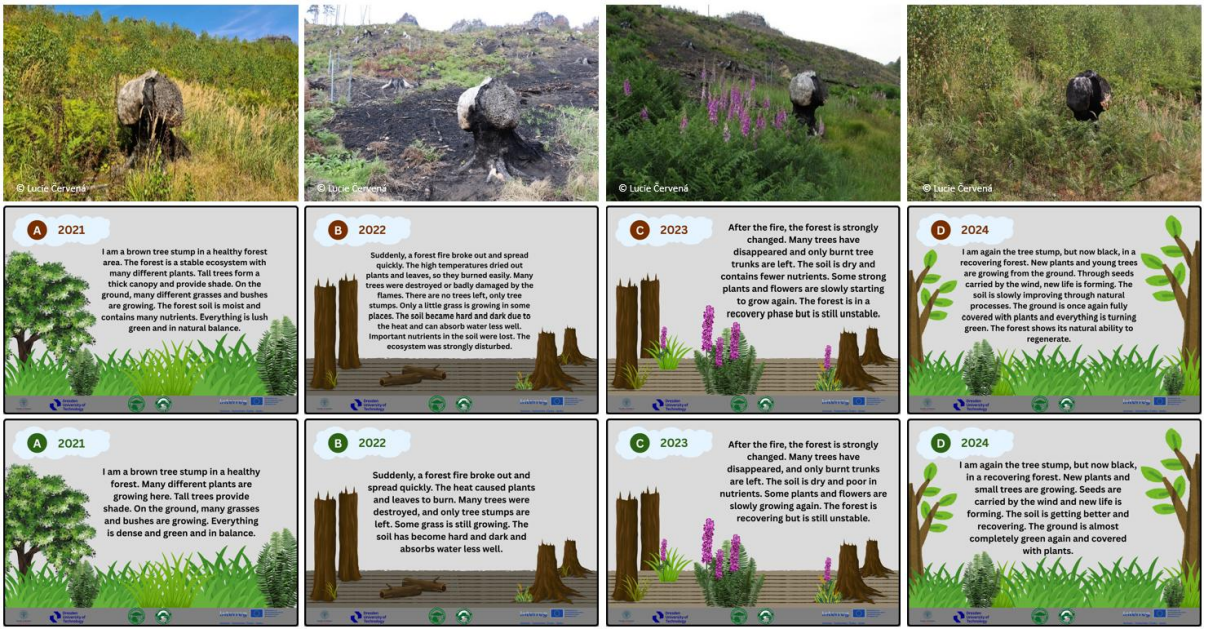




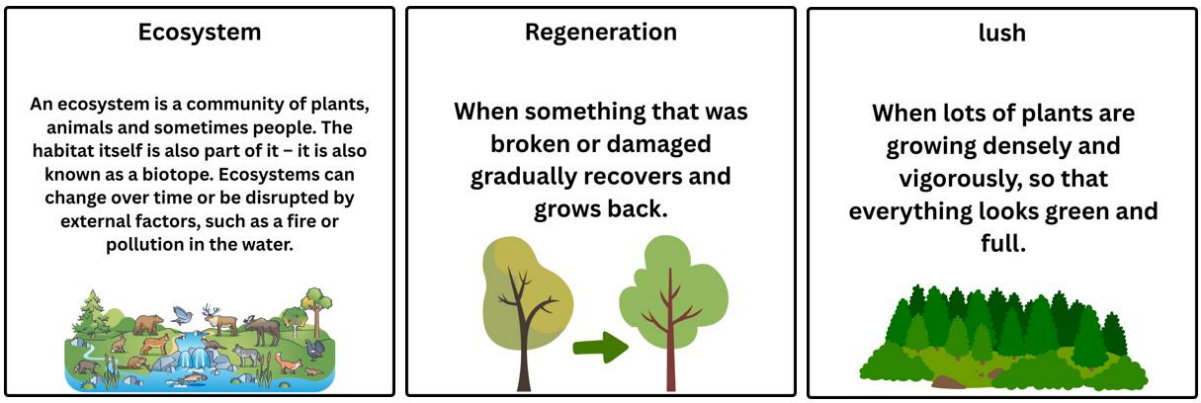




8.4 Picture and story puzzle



8.5 Vocabulary cards



8.6 Example headings (extension 1)

- A: Healthy forest
- B: Forest fire and destruction of the ecosystem
- C: Early regeneration after the fire
- D: Advanced reforestation and natural recovery

8.7 Child-friendly explanation: remote sensing (extension 2)

Remote sensing means that scientists observe the Earth without being directly on site.

To do this, they use special tools such as satellites in space, aeroplanes or drones that take photos of the Earth. These images show, for example, forests, cities or rivers from above.

This allows researchers to see what has changed. They compare images from different points in time – for example, from this year and from last year. This lets them see whether a forest has changed: Are the trees healthy? Are there any bare patches? Or is the forest growing back?

You can think of remote sensing as a very powerful camera high up in the sky. It helps to discover things that are hard to see from the ground, such as large forest fires or damaged forest areas.

In short: remote sensing means observing the Earth from a distance and understanding how it is changing.

8.8 Illustration through examples (aeroplanes, drones, satellites) and aerial photographs







8.9 Reflection cards

My forest of the future

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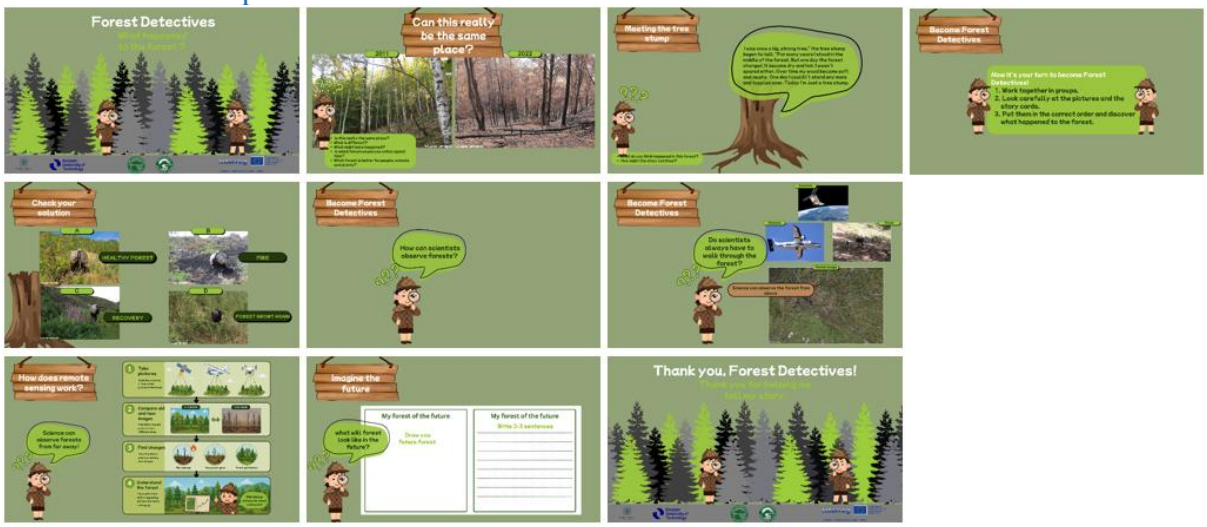
My forest of the future

8.10 Poster for reflection

Our forest of the future

8.11 PowerPoint presentation for the whole lesson



9. Checklist

1. Before lesson

☐ If using the optional research task (3. Development – part 1): check internet access and device availability for pupils

☐ Optional: collect a real healthy and burnt/unhealthy branch/twig

2. Materials to print and/or cut

☐ A3 Picture pair for the introduction (see appendix 8.1) – *does not need to be printed if a projector/screen is used*

☐ Enough sets of A5 Picture and A5 text cards A–D for the picture and story puzzle for every group (see appendix 8.4) – in both differentiation variants:

– Green lettering = simplified material

– Brown lettering = extended material

☐ Vocabulary cards for higher-achieving groups (see appendix 8.5)

☐ Extension 1: A3 pictures of the text cards A–D (see appendix 8.4) – *does not need to be printed if a projector/screen is used*

☐ Extension 2: Example images / aerial photograph (see appendix 8.8) – *does not need to be printed if a projector/screen is used*

☐ 14×14 cm reflection cards one per child (drawing and writing cards) (see appendix 8.9)

☐ A1 poster for reflection (see appendix 8.10) – *does not need to be printed if an existing poster is being used*

3. Materials to bring / set up in the room

☐ Projector and computer/laptop for displaying the pictures

☐ Glue sticks or tape (for sticking the children's contributions onto the class poster)

☐ Pens, pencils, colouring materials for the creative phase

10. Licence

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